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AUTOMATIC PALLETING MACHINE FOR SOLID PRODUCTS HAVING A  
PARALLELEPIPEDAL CUBIC SHAPE

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Priority:	[None]

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The present invention relates to instruments of the "automatic palleting machine" type which automatically deposit on square palettes a defined number of solid elements or products having a parallelepipedal cubic shape.

In the known devices of the type, the products are placed on palettes by an automatic tightening device with pneumatic or hydraulic control, whose capacity corresponds to the surface area of the palette.

For products made of cast concrete, the products are separated from the molded supports by means of a pusher which places the products on a table. A grip, which is mounted on a carriage undergoing a translation movement, takes some of the products placed on the table and positions them on the palette. The grip which takes only some of the products presents the drawback that, after a certain number of maneuvers, the table becomes clogged and all the upstream equipment, the pusher, the conveyor and the unstacker, become jammed, causing the chain to stop for as long as it takes the grip to catch up. The action of the grip is necessarily rapid and abrupt because of the production rates to be carried out, and very often the products to be placed on the palettes are broken or they escape from the grip during the translations, or the products are cracked and they do not escape from the grip, and the maneuvers must be monitored continuously so that the broken or cracked products are replaced, in a manual procedure.

The device according to the invention makes it possible to avoid these drawbacks. Indeed, in said device, the deposition of a defined number of elements or products on palettes takes place automatically, even if the molding surface areas originating from upstream are greater than or smaller than the module of the palettes, the deposition is carried out without the

products being grabbed by grips, which would be incompatible with the small resistance of some products, and consequently the problem of clogging and stoppage of any upstream equipment is overcome. Constant monitoring is not necessary.

The device which is the object of the invention comprises a frame to which a hydraulic or mechanical pusher is fixed, which, during the pass, releases the molded supports of the products that are conveyed by a conveyor two by two. The pusher arranges the products so removed from their supports on a sorting table.

A hydraulic or mechanical pusher is fixed to the frame, perpendicularly to the latter. Its push bar is given dimensions as a function of the dimension of the palettes, and the pusher functions only when the number of the products corresponds to the one that was chosen for the constitution of a level of products on the palettes and it evacuates the latter on a lifting table. If the number of products brought to the sorting table is greater than the chosen number, the excess is stored on a waiting table. If the number of products is less than the chosen number and products are stored on the waiting table, the missing difference is introduced on the sorting table by a pusher who pushes the latter products.

When the number of products stored on the waiting table corresponds to the chosen number, the pusher, acting in the reverse direction, pulls and reintroduces the products on the sorting table, and the latter are pushed on the lifting table.

The clogging and the stoppage of the entire upstream chain is avoided thanks to the operation of reintroduction of the excess products stored on the waiting table, a process which is more rapid than the operation which releases the molded supports.

The lifting table is mounted on a body with four rollers, whose tracks are integrally connected to the frame, and it is set into a simultaneous movement of translations and elevation,

which can be controlled hydraulically or mechanically. The lifting table assumes a position above a palette carrier table, and simultaneously a skirt with a guillotine is placed behind the products, which functions as abutment to maintain the products in place when the lifting table is removed and moves backwards towards its loading point.

The swing out of the lifting table corresponds to a complete level on the palette, and the palette carrier (with mechanical or hydraulic control) is lowered by performing a one-quarter rotation to allow the transverse arrangement of the products of the next level.

The control of the palette carrier is provided with a system for the selection of the number of the levels by display.

The control of its descent and of its positioning is achieved in a very precise manner by a photoelectric cell, and the cell automatically compensates for any differences in height, which may be added to the number of palletized heights.

When the loading of the palette is finished, a pusher with hydraulic or mechanical control extracts it and places it on a roller table while a pusher carriage, arranged on a magazine for the vertical storage of empty palettes, places a new palette on the palette carrier.

All the movements of the palleting device are synchronized and controlled by entirely automatic electro-mechanical equipment.

The apparatus stops in the case of absence of empty palettes in the storage magazine, when no products arrive from the manufacturing line.

The electro-mechanical equipment also allows the manual operation with the help of push buttons.

The drawing in the appendix illustrates, as an example, an embodiment of the device according to the present invention.

As represented, the device comprises a support frame (1), to which are attached a pusher (2) which during the pass releases the mold supports (3) two by two, which are conveyed by a conveyor (4). The pusher (2) arranges the products (5), which are extracted from the supports (3), on a sorting table (6). A pusher (7) arranges the number of products (5) corresponding to the number chosen for the constitution of the palettes on a lifting table (8). The excess products are stored on a waiting table (9) and reintroduced on the sorting table (6), when the number corresponds to the number chosen for the constitution of the palette or if there is a lack of product by a pusher (10) acting in the opposite direction.

The lifting table (8) assumes a position above the palette carrier table (11), and simultaneously, a skirt (12) is placed behind the products while the lifting table (8) returns to its starting point and thus deposits a new set of products retained on the palette (13) which is maintained by the palette support (11). When the number of levels of products on the palette (13) has been reached, a pusher (14) evacuates the latter on a roller table (15), while a pusher carriage (16), arranged on a storage magazine (17) for storing empty palettes (13), places a palette (13) on the palette carrier (11).

The device which is the object of the invention can be used in all the cases where solid products having a parallelepipedal cubic shape are placed automatically on palettes, without any risk of deteriorating the palettes and without stoppage of the chain. It can be used in the industry.

Particularly advantageous applications can be the placement on palettes of molded concrete products, such as blocks, slabs, cobblestones, curbstones, as well as boxes made of wood, metal or plastic.

## Claims

1. Device for automatically arranging on palettes a defined number of solid elements or products having a parallelepipedal cubic shape, characterized by the fact that it comprises a storage area for storing the excess products and for the introduction of some of the latter or all of the latter if the quantity corresponds to the quantity chosen to cover a level of palettes without clogging and without stoppage of the chain upstream.

2. Device to Claim 1, characterized by the fact the products stored on the storage are excess products compared to the number chosen to constitute a level of a palette.

3. Device to Claim 1, characterized by the fact the products stored on the storage are reintroduced partially into the palette loading chain to make up for the lack of products as needed to constitute a level on a palette.

4. Device to Claim 1, characterized by the fact when the storage area comprises a sufficient number of products corresponding to the number chosen to constitute a level on a palette, the totality is introduced into the loading chain.

5. Device to Claim 1, characterized by the fact the reintroduction of the excess products in the loading chain prevents clogging and stoppage of the latter.

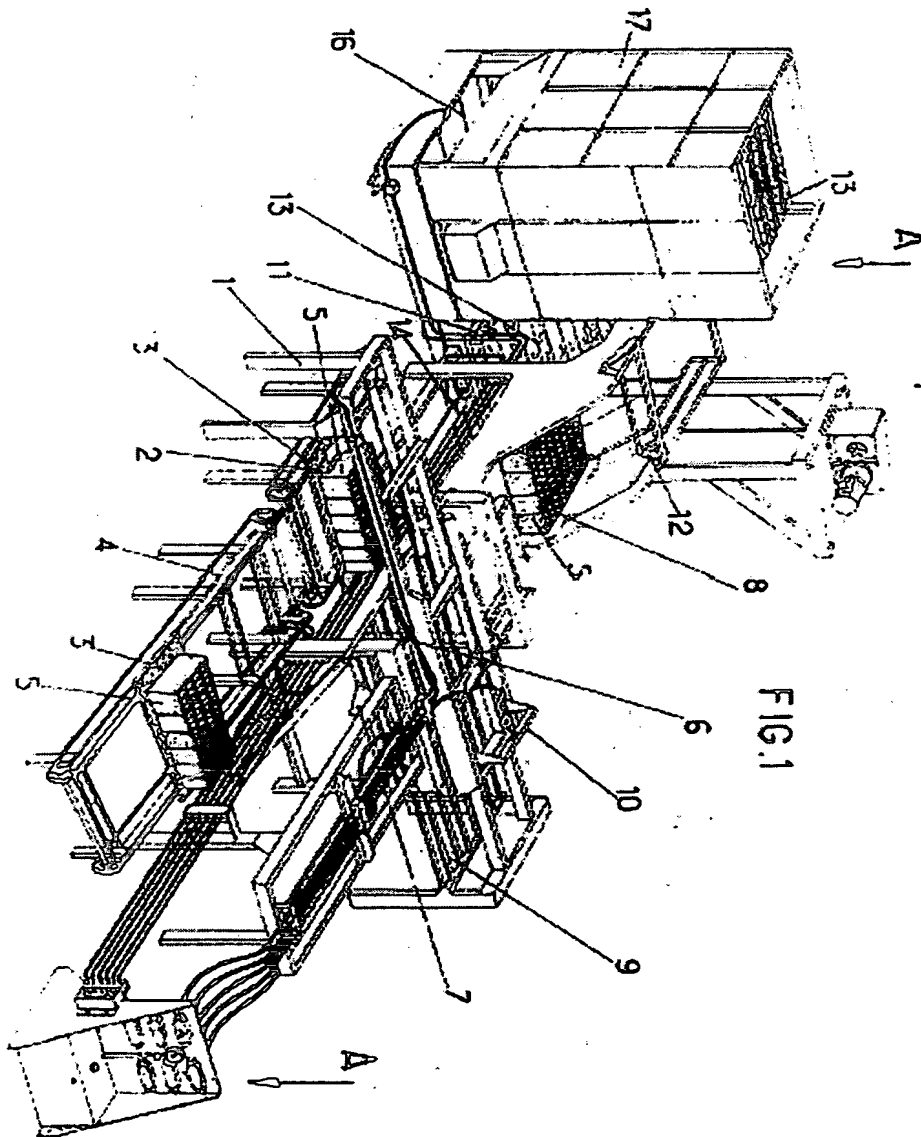
6. Device to Claim 5, characterized by the fact the clogging and the stoppage of the chain upstream is prevented by the action of reintroduction, which is more rapid than the action of feeding new products.

7. Device to Claim 1, characterized by the fact the products are introduced by sliding and as a result there is no risk of deterioration of these products.

8. Device to Claim 1, characterized by the fact, thanks to the automation of all the movements, no manual intervention at all is necessary.

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